<u>REMARKS</u>

The applicants have carefully considered the official action mailed on June 26, 2007, and the references cited therein. In the official action, claims 1-32 were rejected under 35 U.S.C. §102(b) as allegedly anticipated by Dubey et al. (U.S. Patent No. 5,812,811).

By way of this response, claim 33 has been added for consideration, leaving claims 1-33 pending in this application, of which claims 1, 19, 24, 31, and 33 are independent. No new matter has been added. In view of the following remarks, the applicants respectfully traverse the rejections. Favorable reconsideration is respectfully requested.

The applicants respectfully submit that independent claim 1 is allowable over the art of record. Independent claim 1 is directed to a method of compiling a program that, *inter alia*, determines cost values for at least one of a speculative parallel thread candidate, and selects a set of speculative parallel threads from a set of speculative parallel thread candidates based on cost values. The cited reference does not describe or suggest determining cost values for at least one of a speculative parallel thread candidate, and selecting a set of speculative parallel threads from a set of speculative parallel thread candidates based on cost values, as recited in claim 1.

Dubey et al. describe, *inter alia*, delineating potential future threads for parallel execution and discarding future threads that violate dependencies. [*Dubey et al.*, Abstract]. To identify potential dependency violations, Dubey et al. employ a thread management unit and a dispatcher block to permit parallel fetching and execution of main and future threads out of a sequential trace order. [*Dubey et al.*, 6:52 through 7:10, FIGS.

1A and 1B]. While Dubey et al. describe that the thread management unit may perform a

thread validity check to ascertain if some or all of the instructions executed by each of the

future threads need to be discarded due to a violation of program dependencies (*see*

Dubey et al., 15:27-35 and FIG. 2A), Dubey et al. are completely devoid of determining

cost values for at least one of a speculative parallel thread candidate. In the event that

one or more future threads are valid, a merge is performed with a main thread (*see*

Dubey et al., 15:36-40), but Dubey et al. pay no regard to any criteria related to a cost

value for a speculative parallel thread candidate, as recited in claim 1. Because Dubey et

al. fail to describe or suggest determining a cost value for at least one of a speculative

parallel thread candidate, Dubey et al. do not, and certainly cannot select a set of

speculative parallel threads from a set of speculative parallel thread candidates based on

cost values, as recited in claim 1.

At best, Dubey et al. describe that a check may be made to determine availability

of machine resources for forking an additional future thread, such as an available

program counter or available internal buffer space. [*Dubey et al.*, 15:57-64]. However,

merely checking machine resource availability cannot fairly be construed as selecting a

set of speculative parallel threads from a set of speculative parallel thread candidates

based on cost values. In fact, as shown in FIG. 2B of Dubey et al., in the event that

resources are not available, Dubey et al. describe execution of the main thread, which is

neither determining a cost value for at least one of a speculative parallel thread candidate

nor selection of a set of speculative parallel threads based on the cost value.

Thus, because Dubey et al. fail to describe or suggest determining cost values for

at least one of a speculative parallel thread candidate, much less selecting a set of

speculative parallel threads from a set of speculative parallel thread candidates based on cost values, independent claim 1 necessarily fails to anticipate Dubey et al. The applicants respectfully request that the rejection of independent claim 1 be withdrawn for at least the foregoing reasons. Accordingly, the rejection of claims 2-18 dependent upon independent claim 1, must also be withdrawn for the foregoing reasons.

Independent claims 19, 24, and 31 are also allowable over the art of record for reasons similar to those set forth above in connection with independent claim 1. In particular, each of claims 19, 24, and 31 is directed to an article of manufacture storing machine readable instructions, an apparatus, or a system that, *inter alia*, determines a cost value for at least one of a speculative parallel thread candidate, and selects a set of speculative parallel threads from a set of speculative parallel thread candidates based on a cost value. None of the cited references describes or suggests determining a cost value for at least one of a speculative parallel thread candidate, and selecting a set of speculative parallel threads from a set of speculative parallel thread candidates based on a cost value, as recited in claim 19, 24, and 31, and claims dependent therefrom.

The applicants also submit that independent claim 33 is allowable over the art of record. Independent claim 33 recites, *inter alia*, determining a likelihood that a data dependency violation will occur, determining an amount of computation required to recover from the data dependency violation, and selecting at least one of a set of speculative parallel thread candidates based on a lowest likelihood of misspeculation. None of the cited references describes or suggests determining a likelihood that a data dependency violation will occur, determining an amount of computation required to recover from the data dependency violation, and selecting at least one of a set of

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speculative parallel thread candidates based on a lowest likelihood of misspeculation, as recited in claim 33.

The examiner appears to contend that Dubey et al. describe determining a likelihood that the data dependency violation will occur, and determining an amount of computation required to recover from the data dependency violation. [*See page 5 of the official action*]. In particular, the examiner appears to contend that the bank of dispatchers described by Dubey et al. (*see* 7:10-20 and FIG. 1A) allegedly describe the aforementioned subject matter. However, Dubey et al. merely describe that the dispatchers are associated with corresponding program counters and are capable of decoding and analyzing dependencies. In fact, Dubey et al. are completely devoid of any description or suggestion of a likelihood that the data dependency violation will occur, determining an amount of computation required to recover from the data dependency, much less selecting at least one of the set of speculative parallel thread candidates based on a lowest likelihood of misspeculation, as recited in claim 33. While Dubey et al. describe that a probability of misprediction of a loop control flow speculation may be high for data dependent circumstances (*see Dubey et al.*, 3:29-34), Dubey et al. fail to describe or suggest any determination of a computation required to recover from a data dependency, much less selecting at least one of the set of speculative parallel thread candidates based on a lowest likelihood of misspeculation.

Thus, for at least the foregoing reasons, the applicants respectfully submit that all pending claims are now in condition for allowance. If there are any remaining issues in this application, the applicants urge the examiner to contact the undersigned agent at the number listed below.

The Commissioner is authorized to charge any deficiency in the enclosed check toward payment of any fee due for the filing of this paper to deposit account number 50-2455.

Respectfully submitted,

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